and for three months paroxysm very severe, occurring at 2 o'clock A. M. Bronchitis considerable; some emphysema; very severe case; relieved at once, cured in eight days. (One relapse after 13 months; relieved in two days; inhalations continued four nights thereafter.)

4. Mrs. C., æt. 40. Very similar to No. 2. Autumnal, no cardiac complications; recovery; no return the following year.

5. W. P. (brewer), æt. 32. Attacks diurnal, occurring 4 A. M. Complicating bronchitis considerable; part plethoric, no cardiac disease; relieved immediately and recovered in four days. (No relapse for past seven months.)

Note.—It should be stated that, in this and in all cases accompanied by bronchial inflammation, appropriate treatment is resorted to in addition; the medicated inhalations being relied upon simply to reduce the hyperæsthesia.

6. Mrs. C., æt. 45. Bronchial complication considerable. Asthmatic feature relieved; relapse in ten days, relieved in forty-eight hours. (In this case the asthma was evidently not a predisposing or exciting cause of the bronchial trouble, but a result of it, and a second relapse has been successfully treated without resort to the protoxide.)

7. Mr. H., æt. 16. Patient has had hemiplegic paresis for several years. Attacks of asthma diurnal and autumnal. Heart somewhat hypertrophied (eccentric).

Usual period of suffering four months. Relieved at first exhibition of remedy; cure apparently complete after fourth (no relapse).

Any prolonged detail of cases would probably be superfluous. The brevity of the record in those given is to be regretted, but the concomitant symptoms, the exciting and predisposing causes, common to asthmatics, are so familiar, that the fear of needless prolixity will be perhaps a sufficient apology.

ART. IV.—*Aneurisms of the Arteries at the Base of the Brain: their Symptomatology, Diagnosis, and Treatment.* By ROBERTS BARTHOLOW, M.D., Prof. of Materia Medica and Therapeutics in the Medical College of Ohio. Lecturer on Clinical Medicine and Physician to the Good Samaritan Hospital, Cincinnati, Ohio.

IT may be proper to state at the outset, that it is not intended in this article to embrace an account of *miliary* aneurisms, first described by Charcot and Bouchard, which play so important a *role* in the causation of certain morbid states of the brain. It is my purpose to discuss the symptomatology and diagnosis of aneurisms of the larger arterial trunks which give rise to symptoms common to new formations in general, by interference with the functions of neighbouring parts. It is very desirable, if the facts and observations in our possession will warrant it, to separate the symptomatology of aneurismal growths from those of other neoplasia. It is certain that there are no distinctive differences in the symptoms, but by attention to certain signs, to be hereafter detailed, a fortunate guess may at least be made.

This paper is based on the study of (1) a case of aneurism of the basilar artery occurring in the practice of Dr. Isham, of Cincinnati, which I saw at various times during life and examined after death; (2) The letters of Lebert,[1] containing 86 cases of intracranial aneurism collected from various sources; (3) The monograph of Durand,[2] embracing the statistics of Griesinger (*Archiv der Heilkunde*, 1862), of Lebert, and of Gouguenheim (*Des Tumeurs aneurysmales du Cerveau*, Paris, 1866); and (4) a number of cases which have been published in various Journals and Society Transactions, since the appearance of the exhaustive essays mentioned above. Many of these are mere transcripts of *post-mortem* observations. In some the *ante-mortem* observations were not made with accuracy and minuteness, and hence are not suited for an analysis of the symptoms. An entire failure to recognize cerebral symptoms due to hasty and imperfect observations, renders some other reported cases of little value. As an example how attention to some prominent symptom may lead the physician away from the true lesion, I may mention the case reported by Dr. Semple (*Trans. of the Pathological Society*, vol. xx. p. 112), in which an aneurism of the basilar artery caused no symptoms, the patient being treated for bronchitis!

It is to be understood that the cases which I have collected as the basis of my observations were omitted from or have been reported since 1868, the date of Durand's monograph. In Griesinger's, Gouguenheim's, Lebert's, and Durand's essays are contained nearly all the published cases of note reported up to the date at which they were respectively issued. This is the fact indeed with regard to the numerous English contributions of Brinton, Gull, Ogle, and others, to the subject of intracranial aneurisms.

CASE 1. *Singularities of conduct; numbness of left arm; vertigo; orbital neuralgia; convergent strabismus; death; autopsy; aneurism of the basilar artery.*—I am indebted to Dr. Isham, the attending physician, for the following history of this case: "On the 12th of March I was summoned to attend Mr. C——, aged 37, a very active man of nervo-sanguine temperament. He was the subject of severe paroxysmal pain over the right orbit. He also complained of an uneasiness at the back of the neck. His tongue was slightly coated. The pulse and temperature were normal. The case was regarded as a supra-orbital neuralgia, and was relieved by the hypodermic injection of morphia. Quinia pills were also prescribed. He engaged in the business of his calling the next day (13th), and I saw him in the evening. The pain had returned, though much modified in severity; chloral was given with good effect, and the quinia continued.

"I lost sight of him until the 17th, when he presented himself at my office with a closure of the right eye. He complained of slight pain in the ball and numbness of right side of nose and upper lip. In his efforts to elevate the eyelid he would exercise all the muscles of the face. When the lids were separated by traction, the axis of vision was found parallel with that of the right eye. The closure of the lids was attributed to spasm of the orbicularis, and, together with the other symptoms, to be due to disturbance of function in the orbital division of the fifth nerve. A liniment was prescribed to be applied about the eye, to the side of the nose and cheek, and liq. potass. arsenitis ordered. On the 18th he was again at my office in the same condition, except some congestion of the conjunctiva, with pain. He was given a collyrium of morph. sulph., and Fowler's solution was continued. At one of these visits he was examined by Dr. A. T. Keyt, who was present, and who coincided in my view of the case.

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[1] Berliner klinische Wochenschrift, Nos. 20 to 42, 1866. A full abstract may be found in Schmidt's Jahrbücher der gesammten Medicin, vol. cxxxiii. p. 281.

[2] Des Aneurysmes du Cerveau consideres principalement dans leurs rapports avec l'Hemorrhage cérébrale. Paris: Adrien Delahaye, 1868.

"On the 19th, when I was again called to see him, I found him able slightly to raise the lid by voluntary effort; he had also convergent strabismus of right eye, numbness of left hand, conjunctiva injected and pain in eye and head. I then feared lesion of brain involving third and sixth nerves, and warned him to remain quietly at home. The collyrium was continued, and pills of quinia and morphia given. Notwithstanding he was informed of the gravity of the symptoms, he continued in the active duties of his business this day, and almost every day until April 25th. I saw him on the evening of the 19th, when he was suffering agonizing pain, which was controlled either by hypodermic injection or chloral. The next day (20th) he was better, and I changed the treatment to strychnia sulph. gr. $\frac{1}{40}$, quinia gr. ij, *ter die*. I saw him each day one or more times up to April 6th. The symptoms remained much the same; the worst features lighting up sometimes and again receding. Chloral and morphia were exhibited as required. On the 6th of April he seemed much improved, and had almost perfect control of the *levator palpebræ*, but kept the eye closed from photophobia. The appearance of the eye was normal, except very slight convergent strabismus. Pain in the head and eye was still experienced, but in moderate degree. About this time he consulted Dr. Bartholow, at his office, who confirmed fears as to brain lesion. I saw him no more until the 9th, when he was about the same as on the 6th. Was called in to relieve the pain in his head, which I did, and saw him no more until the 12th, when the same office was again performed.

"On the morning of the 14th was again sent for. Found him with intense pain over forehead. Quieted him with chloral during the day, and in the evening applied five leeches to the temples.

"I was called in the 16th, 19th, and 22d to relieve the pain in his head. From the 22d to the 25th he was free from pain in his head, complaining only of fulness.

"On the 25th, which was a remarkably warm day for a spring month, he fainted in the street. Said he felt a tearing and a snap at the back of his neck, and was then rendered unconscious. He rallied sufficiently to reach Dr. Bartholow's office, where the galvanic current was applied with great relief to the pain in his head, which he described as excruciating. Had to give him a hypnotic at night.

"On the 26th he had a spasmodic seizure lasting but a minute or two, from which he awoke as from a dream. Said he experienced a sensation as of a snap at the back of his neck, and recollected nothing more about it. His wife, who alone was present, described his breathing as stertorous. Thought it might be due to the strychnia, and suspended it.

"On the 30th he had been sitting in his easy chair, and a few moments before death he remarked he felt tired, and lay down on the bed. While smelling some flowers and caressing his little boy, his wife heard him exclaim, 'Oh my head,' and he immediately became unconscious and passed into stertor. Within five minutes I reached him. His heart continued pulsating feebly and at intervals for about three minutes, respiration apparently having ceased.

"During the last year of his life Mr. C. was remarkable for his eccentricities and fickleness, and for a childish lack of judgment at times. In conversation he was unable to confine his mind to one subject for any length of time. Often, when engaged in the serious consideration of business affairs with any one, he would suddenly break off to bring in the most trivial matters, very likely having no relation to the business on hand, or which could not have been suggested by it, and in which his auditor could not have the least interest.

"His conduct at times excited suspicions that he indulged in alcoholic liquors, yet he was strictly temperate. His actions were a constant source of mortification and annoyance to his friends. He would interfere with a conversation between parties, in which he had no interest, in the most abrupt and excited manner. On occasions of friends visiting him he would take no notice of them, or hide himself; meeting them at another time, he would be most affable and cordial. He would seek advice of his most intimate and cherished friends, only to go entirely contrary to their judgment and the plainest dictates of common sense.

"His heart could never resist an appeal directed to his pockets. He would rob himself to lend to any body, no matter what security they afforded. When his wife would expostulate with him, he would say: 'It's my head; I know I don't do right, but I can't help it; I do the best I can; I do things which I know at the time I ought not to do, and yet I cannot stop myself.'

"His medical advisers assured him time and again of the great danger of his condition. He would inquire, 'Do you think it is so bad?' and laugh.

"I have recently learned that for more than two years he had complained at intervals of numbness in his left hand and arm. About twelve years ago, while in Illinois acting as a commercial traveller, he was sunstruck, and since that time the peculiarities in his character above described have been observed."

My own observations of the case.—Having had an acquaintance of some years with Mr. C——, and having been consulted several times by him, I am able to add some particulars to the very full and excellent history given by Dr. Isham.

On the occasion alluded to by Dr. Isham, after having experienced the attack of vertigo in the street, Mr. C—— presented himself at my office in the hurried manner which had become habitual. He did not walk—he ran. He talked with extreme rapidity and confusedly, several ideas seeking utterance at the same time. He explained that in stepping from the street to the curbstone, he experienced a terrible sensation in his head, and lost consciousness for a moment. His right eye was closed. The eyelids and soft parts about the orbit were swollen. He had convergent strabismus and diplopia. He could open the eye, but he had great photophobia. In consequence of the pain caused by the light and to correct the disorder of vision, he kept the eye closed. The conjunctiva was injected, the pupil fixed, but not much dilated. An ophthalmoscopic examination, very imperfectly made owing to his restlessness and the convergence of the eye, disclosed a markedly swollen state of the papilla. He complained of great pain in the eye and in the supra-orbital branches of the fifth. There was great tenderness to pressure along the paths of distribution of the supra-orbital nerve. He had twitching of the muscles of the face. Decided numbness existed in the left hand, his appreciation of pain, of heat and cold, and of touch was lowered, and loss of muscular power was ascertained by the dynamometer.

A descending stabile current of six elements passed through the right side of the head gave immediate relief to the pain, and also diminished the vertigo.

Autopsy.—The autopsy was made by the writer in the presence of Dr. Keyt, Dr. Isham, and Mr. Lowry, a medical student. I omit all details not necessary to the elucidation of the symptoms observed during life.

A large amount of blood was found effused in the inferior sub-arachnoid space, extending especially up along the Sylvian fissures, covering the pons and medulla, and filling in the fourth ventricle. A careful examination was made of all the arteries at the base. An aneurismal pouch, one-half inch in its longest diameter, was found on the right side of the basilar artery, in which there was a rent of considerable size. The sixth nerv was here directly impinged upon, and the fifth exhibited changes consequent on irritation from intermittent pressure. The coats of the vessel at this point had undergone the calcareous degeneration and a calcareous plate of considerable thickness formed one side of the aneurism. The vertebral artery on the right side was very small, about one-third the size of the artery on the left. In consequence of this arrangement the blood current from the left vertebral impinged with greatest force against that part of the basilar artery which had undergone the calcareous degeneration. The white substance of the brain was pale. The right lateral ventricle contained considerably more fluid than the left. The accumulation of fluid had taken place, chiefly in the anterior cornu, which was distinctly enlarged by the pressure.

CASE 2.—Girl, æt. 12. Epileptic. Paralysis of right side of face and left limbs. Aneurismal dilatation of right middle cerebral near anterior branch. Aneurism due to embolism from cardiac disease. Sclerosis of pons Varolii. Suspicion of syphilis. (*Echeverria.*[1])

CASE 3.—Man, æt. 67. Epileptic. Dysphagia and paralysis of tongue. Confusion of mind. Aneurism of both vertebrals near junction to form basilar. (*Ibid.*)

CASE 4.—Girl, æt. 26. Epileptic aura proceeding from fingers of the left hand. Ptosis of right eye and paralysis of left limbs. Aneurism of right middle cerebral. Syphilitic. (*Ibid.*)

CASE 5.—Man, æt. 29. Numbness of left side of face and deafness of left ear. Paresis of muscles on left side of face, and loss of taste on left side of tongue. Vomiting. Impaired locomotion, and finally inability to walk. Loss of speech. Aneurism the size of a pigeon's egg on the left side of the basilar artery. (*Loomis.*[2])

CASE 6.—Man, æt. 45. Had an attack of violent convulsions, in which pupils were contracted, recovered, and had four months afterward another seizure.

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[1] On Epilepsy. New York: Wm. Wood & Co. 1870.

[2] Medical Record, January 2, 1872.

In right anterior lobe there was an old clot; also a recent extravasation. Aneurism the size of a pigeon's egg of right anterior cerebral. (*Lorbee.*[1])

CASE 7.—Man, æt. —. Ptosis, œdema, insensibility, and ulceration of cornea and eyelids. No movement of ocular globes. Giddiness and headache. Anæsthesia of right supra-orbital region; right side of nose and partial of right superior maxillary region. Parylysis of 3d, 4th, 5th, and 6th nerves. Aneurism of internal carotid in the carotid canal. (*Adams.*[2])

CASE 8.—Man, æt. —. Had three attacks of paralysis; left hemiplegia, right hemiplegia; paraplegia; headache; hyperæsthesia; double vision. Softening of pons. Large fusiform aneurism of basilar artery 1½ inch by 1 inch. Small sessile aneurism of middle cerebral. (*Russell.*[3])

CASE 9.—Woman, æt. 61. Difficulty of speech; paresis of extremities. Aneurism of left vertebral. (*Sydow.*[4])

CASE 10.—Man, æt. 37. Epilepsy. Aneurism of basilar artery size of a pea. Death by rupture of aneurism. (*Fuller.*[5])

CASE 11.—Woman, æt. 59. Small aneurism of right middle cerebral artery, half inch from carotid. (*Broadbent.*[6])

CASE 12.—Woman, æt. 29. Three years before death had pain in the temple and left side of the head. Afterward had attacks of unconsciousness and temporary difficulty in articulation. Left pupil dilated and sluggish. Paralysis of right side. Head drawn in epileptiform attacks to right shoulder. Aneurism of left middle cerebral, size of a hen's egg. (*Wood.*[7])

CASE 13.—Female, æt. 27. Had a fit followed by paralysis of right side; deafness and inability to speak, followed by insensibility. Aneurism of left internal carotid at point of division into anterior and middle cerebrals. Impinged on left olfactory and optic nerves. (*Bristowe.*[8])

CASE 14.—Woman, æt. 50. Impairment and then loss of motor power in left hand and arm, but not much impairment of sensibility. No paralysis of left leg. Confusion of mind; loss of memory, and difficult articulation. Aneurism of the size of a pea on both middle cerebrals. (*Bastian.*[9])

CASE 15.—Boy, æt. 13. Fell in the street; left arm and leg paralyzed. Aneurism of the size of a walnut of right middle cerebral. (*Church.*[10])

CASE 16.—Man, æt. 40. Aneurism of left middle cerebral. Death by rupture. (*Church.*[11])

CASE 17.—A boy, æt. 14. Convulsions and pains in lower extremities. Headache. Retraction of the head. Pupils of equal size, but not sensitive to light. Epistaxis. Aneurism of the posterior cerebral. (*Hutchinson.*[12])

We do not possess very exact data as to the relative frequency of aneurism of the intracranial vessels and of the other arteries of the body. According to Crisp,[13] of 551 aneurisms of various parts of the body, 7 were intracranial. Durand thinks it premature to make a comparison of this kind. So far as we are concerned in our present inquiry, exact determination of this question is not material. It is more important *for us* to

[1] Archives Générales de Médecine, vol. i. 1868, p. 229.

[2] Surgeon to London Hospital.

[3] British Medical Journal, July 30, 1870.

[4] Schmidt's Jahrbücher der Gesammten Medicin, vol. 130, p. clxi.

[5] Pathological Society's Transactions, 1865, vol. xvi.

[6] Ibid., vol. xvii.

[7] Ibid., vol. xix.

[8] Ibid.

[9] Ibid.

[10] Ibid.

[11] Ibid.

[12] Penn. Hospital Reports, 1869.

[13] Transactions of the Pathological Society, vol. vii.

know the relative frequency with which the intracranial vessels are involved. We may, following Lebert, group for this purpose the arteries of the base into three systems: 1, *internal carotid and its branches*; 2, *the vertebro-basilar arteries*; 3, *the middle meningeal artery.*

The statistics are as follows:—

Lebert, Internal carotid	76 cases.
Durand, " "	29 "
The writer, " "	11 "
Lebert, Vertebro-basilar	35 cases.
Durand, " "	11 "
The writer, " "	7 "
Durand, Middle meningeal	3 "

The internal carotid and its branches thus appear to be the most frequently involved. The individual arteries are affected in the following order, according to Lebert and Durand:—

Basilar	36 times.
Middle cerebral	34 "
Internal carotid	21 "
Anterior cerebral	13 "
Posterior communicating	8 "
Vertebral	5 "
Posterior cerebral	3 "
Inferior cerebellar	3 "
Anterior communicating	2 "

The 17 cases collected by myself make the following exhibit as regards individual arteries:—

Middle cerebral	7 times.
Basilar	4 "
Internal carotid	2 "
Vertebral	2 "
Anterior cerebral	1 "
Posterior cerebral	1 "

With regard to the side of the brain on which aneurisms more frequently occur, the statistics of Lebert and Durand, and those collected by myself, do not agree. According to these authorities the difference in the two sides is as follows:—

Right side of the brain	25 cases.
Left " " " "	35 "
Occurring on both sides	5 "

My own figures are as follows:—

Right side only	6 times.
Left " "	5 "
On both sides	3 "

As regards sex, the proportion between male and female is nearly the same in my collection of cases as in the collections of Lebert and Durand. Of 114 cases given by these authorities, 61 were males and 42 females. The sexes in my cases were distributed thus: 10 males and 7 females.

Exact data on this subject do not exist, but there is much reason for believing that syphilis is the chief cause of intracranial aneurism. In about one-half of my collection of cases there were indications of syphilitic infection. Embolism from cardiac disease probably ranks next in frequency as a cause of arterial dilatation and aneurism.

The size of intracranial aneurisms varies greatly. Those of the anterior and middle cerebral usually attain greater magnitude than aneurisms of other vessels. In this situation they may enlarge considerably without much interference with important neighbouring parts. The size of a pea or of a pigeon's egg is most usual, but sometimes they reach the magnitude of a pullet's egg. Death takes place usually by rupture, and this event occurs irrespective of the size of the aneurism, being determined by its character. These aneurisms are more frequently fusiform than sacculated. Rupture occurs earlier in the latter, especially, if an atheromatous condition of the vessels exists.

General Symptoms of Intracranial Aneurism.—Very attentive consideration should be given to the signs by which we recognize an intracranial neoplasm, in order to separate, if possible, those belonging to aneurism from those caused by other adventitious products. A tumour of any sort, slowly growing in the cranial cavity, will alter or abolish functions in adjacent parts by direct pressure, by setting up an irritative action and consequent alterations of structure, and will affect the functions of the brain in general, by pressure on the whole contents of the cavity. The symptoms caused by the conditions first named in the foregoing sentence generally indicate the position of the neoplasm. It will be most convenient to consider these after having examined the general disorders of the functions of the cerebral mass.

Clouston[1] has recently reported some very curious observations, showing the influence of continuous pressure on the contents of the cranial cavity. In two cases of brain tumour, he found after death, "that a portion of the gray and white substance of the convolutions had passed through a small lobe in the dura mater, expanded on the outside of it in a secondary cranial cavity it had made for itself by absorption of the skullcap." These unique observations throw a flood of light on the much disputed cause of *hernia cerebri*. The experimental studies of Pagenstecher[2] also furnish us much valuable information in regard to the influence of pressure on the functions of the brain, but the effects of pressure, suddenly and artificially produced, cannot fully illustrate the phenomena which follow the slowly-developing pressure of an aneurism or brain-tumour. It is certainly the case, however, that a new formation developing in any part of the cranial cavity must interfere, by pressure, with every other part, and symptoms will usually be present, although they may not be so pronounced as to attract attention.

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[1] Journal of Mental Science, July, 1872.

[2] Experimente und Studien über Gehirndruck. Heidelberg, 1871.

Vertigo.—One of the earliest symptoms experienced is dizziness. This appears to me to possess no little value as a diagnostic mark, for in other tumours of the brain, vertigo is a symptom coming on at a much more advanced period in the history of the case. In the beginning slight, and but momentary in duration, it increases in severity, and becomes at last nearly constant. The severity of the vertigo varies with different causes. Exercise and emotional disturbance, as well as all medicinal agents exciting the intracranial circulation, increase its violence. Quiet in the recumbent posture diminishes it. Sometimes it is so severe as to render any effort of the mind distressing, and it may even proceed as far as loss of consciousness.

In the case which I have reported, as well as in many others, strange sensations were experienced in the head. This may be a localized throbbing—"snapping," as my patient expressed it. These sensations are usually referred to the neighbourhood of the position of the aneurism, as the occiput in the case of basilar aneurism, the middle ear in aneurism of the internal carotid, and the temple when the anterior cerebral is involved.

Headache is a constant symptom in intracranial aneurism. Like the abnormal sensation referred to above, the site of greatest intensity of pain indicates the position of the aneurism. This is especially the case in basilar aneurism, the pain being felt in the nucha, or about the occipital protuberance. The headache is also general, with periods of exacerbation, in addition to the strictly local pain. A distinction is to be drawn between the headache properly so-called, and the neuralgic pain in the distribution of the fifth, due to pressure on the trunk of the nerve. It is true the general headache in these cases is caused, most probably, by stretching of the fibres of the fifth distributed to the dura mater, but this pain is different in character from an orbital neuralgia, for example, due to pressure on the ophthalmic division of the fifth.

Epileptiform convulsions occur in about one-half of the cases. The attacks, as regards severity, vary from simple and momentary loss of consciousness, to the most violent clonic convulsions. Besides general convulsions there occur local spasms, as twitching of the facial muscles, of the muscles of the neck, of the trapezius, etc. The occurrence of epilepsy appears to be influenced by the vicinity of the aneurism to the "*spasm-centre*" of Nothnagel; hence, this symptom is to be expected in aneurism of the vertebro-basilar system, and to be considered exceptional in cases of aneurism involving the anterior and middle cerebrals. Convulsions occur, it is true, when aneurisms of these last-named vessels give way, but such spasms are clearly different from those caused by irritation of the medulla oblongata. This statement is opposed to the views enunciated by Niemeyer,[1] who holds that tumours involving the cortical periphery are more frequently accompanied by epileptiform convulsions. His words are as follows:—

"It is very remarkable and inexplicable that they occur almost solely when the tumours are in the cerebrum, and when they are near the cortical substance."

Russell Reynolds[2] gives an opinion, "as the result of an examination of a large number of cases, that convulsions are most common when the disease is situated in the posterior lobes of the brain, or in the cerebellum, and least frequent when the anterior lobes are affected."

Jaccoud[3] says that epileptiform convulsions result from excitation of the medulla oblongata, by direct irritation, or, through reflex influence, by a distant irritation.

Every body is now familiar with the remarkable experiments by which Nothnagel[4] established the existence of a "spasm centre," and of Setschenow, who demonstrated an inhibiting centre for reflex movements. These facts, determined experimentally, agree with the statistics which I have collected, showing the more intimate dependence of epileptiform convulsions on tumours at the base of the brain. I should not fail to note, however, that Ladame, who has written an elaborate work on brain tumours, (*Symptomatologie und Diagnostik des Hirngeschwülste*) in a paper on tumours of the pons in the *Archives Générales*, thus formulates his opinions on this question:—

> "If a tumour has attained sufficient size to allow of its presence being diagnosticated, and if convulsions be present, the probability is the seat of the tumour is not in the pons Varolii."

The case of aneurism of the basilar (case 1st) was characterized by two kinds of epileptiform attacks: loss of consciousness without, and loss of consciousness with, convulsions. The rule of Ladame is, therefore, much too absolute. Epilepsy seems to be a constant symptom in aneurism of the vertebral arteries.

Jaccoud, in making a differential diagnosis between aneurisms and other tumours occurring within the cranium, asserts that the *psychical functions* are little or not at all affected. This is not in accordance with my own conclusions after the examination of many reported cases, and is certainly negatived by the facts of case 1st.

Lebert enumerates under the head of disorders of intelligence, feebleness of mind, impaired memory, stupidity, delirium, and transitory paroxysms of mania. Dr. Clouston, in the paper from which I have already quoted,[1] gives, amongst others, the following deductions in regard to the mental symptoms of brain tumours based on an analysis of six cases:—

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[1] Niemeyer, Text-Book of Practical Medicine, Am. ed., vol. ii. p. 242.

[2] System of Medicine, vol. ii. p. 480.

[3] Traité de Pathologie Interne, tome premier, Paris, 1870, p. 260.

[4] Archiv für Patholog. Anat. Band xliv., Hft. 1.

> "That irritability and loss of self-control are the first mental symptoms of those tumours of the brain which directly produce morbid psychosis.
>
> "That a blunting of the whole of the mental faculties soon comes on, and gradually passes into coma."

It is no doubt true of intracranial aneurisms, as of other adventitious products in the brain, that they sometimes occur without any disturbance of the psychical functions. That no symptoms of mental disorder were observed in many cases, is not conclusive that none existed. Many of the reported cases came under observation when such accident as rupture required admission to the hospital or medical attendance, and then an imperfect history only could be obtained.

Special Symptoms.—Aneurismal tumours of the arteries entering into and forming the circle of Wills, may interfere with and prevent or interrupt the function of all of the cranial nerves from the first to the twelfth. They may cause softening by pressure of the anterior and middle lobes of the cerebrum, and part of the cerebellum. They may impinge upon and disorder the function of the crura cerebri, the pons Varolii, and the medulla oblongata. They may compress the superior and inferior petrous sinus, the cavernous sinus, the transverse sinus, and the coronary sinus. The special symptoms which they produce will indicate with great certainty their situation. An aneurism of the internal carotid will affect the sense of smell by compression of the olfactory nerve; will also cause ptosis, convergent strabismus, and a dilated pupil by pressure on the motor oculi; will produce amaurosis by direct interference with the optic; will cause congestion of the eye and swelling of the veins of the face by compression of the cavernous sinus, and will be accompanied by intense tic douloureux, especially in the ophthalmic division due to irritation of the fifth nerve. With the growth of the tumour, especially if that portion of the artery within the carotid canal be involved, there will occur noises, pulsating in character, in the ear, followed by impaired hearing, and finally, by complete deafness. The facial nerve may also become involved, and paralysis of the face on the same side will be observed. Softening of the neighbouring part of the middle lobe will take place, and by reason of this, or by pressure on the crus cerebri, crossed hemiplegia will occur.

As the middle cerebral, except the first part, does not come into relation to the cranial nerves, and lies in the fissure of Sylvius, between the anterior and middle lobes of the cerebrum, an aneurism of this vessel may attain considerable size without producing any other symptoms than those common to adventitious products in the brain—headache, pulsative in character, vertigo, confusion of mind, visual disorders, etc. The headache is usually felt in the temples. In consequence of the pressure of these growths, softening of the neighbouring cerebral tissue takes place, and when extensive may, of course, invade the motor tract, causing hemiplegia. When the aneurism is on the left middle cerebral, aphasia may be present, with or without right hemiplegia.

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[1] Journal of Mental Science, July, 1872.

Occasionally, the motor oculi may be impinged upon, when there will occur ptosis, divergent strabismus, etc. Convulsions do not often take place. When the artery gives way, convulsive seizures may be observed, similar to those which accompany extensive meningeal hemorrhage. The extravasation may not be sufficient to terminate life, when the case is assimilated to one of ordinary apoplexy, due to a rupture of an atheromatous vessel or a miliary aneurism.

The *posterior communicating artery* is in a situation to come into relation with parts, the disturbance of whose functions causes very characteristic signs. It lies under the optic tract and the crus cerebri, and the third and sixth nerves pass alongside of it. Disturbances of vision due to pressure on the optic and motor oculi would hence be present early. As the tumour enlarges, disorder of locomotion, or hemiplegia, results from pressure on the crus cerebri. Epilepsy has been observed, and Lebert speaks of mental apathy, stupor, delirium, monomania, as symptoms in these cases.

The most important of the intracranial aneurisms are those seated on the *basilar artery.* This vessel is more frequently affected in this way than any single artery of the brain, and it comes into relation with some of the most important parts of the encephalic mass. The crura cerebri, the pons, the medulla oblongata, the cerebellum, and the third, fourth, fifth, sixth, seventh, and eighth nerves may be directly impinged on as an aneurism enlarges. The symptoms will vary with the position of the aneurism, as regards the direction of the vessel, and the size of the tumour. One of the earliest, most distressing and persistent symptoms is headache. This is very commonly, indeed, felt in the occiput, and is sometimes confined to a limited region. Frequently the pain radiates from this point, over the neck and shoulders. Besides headache, tic douloureux is sometimes present. This symptom, as in Case 1, is dependent on irritation of the trunk of the fifth, and the side on which the pain is felt is determined by the position of the aneurism. Convergent strabismus will occur when the sixth nerve is paralyzed by pressure, and ptosis, a dilated pupil and divergent strabismus, when the third nerve is destroyed. When the third, fourth, and sixth nerves are involved, the eye will be without motion, the pupil dilated and fixed. Pressure on the cavernous sinus will cause optic neuritis, "choked disks,"[1] and swelling of the eyelids and face by interference with the return of blood through the ophthalmic and facial veins. Vertigo is also usually present, but, according to Lebert, not so commonly as headache. The vertigo is frequently accompanied by odd sensations felt in the occiput, due in part to the vertigo, and in part to pressure and irritation of the motor tract. More or less disorder of locomotion may occur. Sometimes, but rarely, the irritation extends deeply enough to involve the sensory fibres, when hyperæsthesia, or, if the change has proceeded as far as destruction of tissue, anæsthesia, may be present, and may be more or less symmetrical on the two sides of the body. Bilateral numbness, alternating hemiplegia, auditory paraplegia, or a general paralysis may ensue. Very commonly the nerve is so far damaged as to cause deafness. Dysphagia and aphonia (paralysis of chorda tympani, glosso-pharyngeal, etc.) may be present. The speech is frequently affected, sometimes hesitating, sometimes precipitate, as was well marked in Case 1.

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[1] Allbut, On the Use of the Ophthalmoscope.

Various mental symptoms are usually observed, as feebleness of memory, mental depression, and various perversions of the moral and intellectual faculties.

In aneurism of the *vertebrals*, we observe dysphagia, aphonia, vomiting, obstinate constipation, disorders of motility and sensibility, epileptiform convulsions, and finally the mental symptoms common to aneurisms of the other arteries of the base.

Treatment.—The remedial management of intracranial aneurisms is not an entirely hopeless undertaking. Mr. Coe[1] cured an aneurism of the internal carotid by ligation. At least the symptoms which were considered characteristic of intracranial aneurism, disappeared after tying the vessel externally. This operation offers a reasonable expectation of success in the case of aneurism of that portion of the artery in the carotid canal.

Since the remarkable demonstration by Langenbeck,[2] of the influence of ergotin administered hypodermically, over aneurisms situated externally, we have in this remedy a precious resource against intracranial aneurism. If, as Hildebrandt[3] has recently shown, ergotin may cause absorption of uterine fibroids by its action on the vessels, it requires little exercise of faith to believe that it may accomplish good results in intracranial aneurism. The solution employed by Langenbeck was as follows: ℞.—Ergotini, gr. ij; spts. vini rect., glycerini puri, āā ʒss. Five minims contain $\frac{1}{8}$ of a grain.

Hildebrandt recommends a solution of three parts of the aqueous extract of ergot (Ergotin of Bonjean) in seven parts each of water and glycerine. This occasions less smarting than a solution containing alcohol.

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[1] Holmes's System of Surgery, vol. iii., 2d ed.

[2] Berliner klinische Wochenscrift, No. 2, 1869.

[3] Ibid., No. 25, 1872; also Quarterly Summary in current No. of this Journal.

At the same time that ergotin is being used hypodermically, we may employ the iodide of potassium internally. Since the publication of the results with this agent, by Roberts, of Manchester, and Balfour, of Edinburgh, it has been used with more or less success in the treatment of internal aneurisms. As syphilis appears to be one of the most important factors in the causation of intracranial aneurisms, the iodide of potassium is especially indicated in those cases originating in this way. In order to be effective, this remedy must be administered in large doses, ℈j to ℈ij or more, three times a day.

Besides these two remedies, we may employ the galvanic current for the relief of the neuralgia of the fifth, which so frequently attends aneurism of the vessels at the base. A downward stabile current, from six elements of Siemens and Halske, gave great relief to Case 1.

The reader may ask what personal experiences I have to offer in favour of this method of treating intracranial aneurism. In one case, in which the character of the symptoms indicated an intracranial neoplasm, most probably aneurismal, I succeeded in procuring marked amelioration, and, it may be cure, by a persevering use of large doses of iodide of potassium, and the galvanic current. I have not reported this with the other cases, because there must ever remain a great degree of uncertainty in regard to the existence of an intracranial aneurism, the actuality of which has not been demonstrated by *post-mortem* examination.

ART. V.—*Hypodermic use of Strychnia.* By JULIAN J. CHISOLM, M.D., Professor of Operative Surgery, University of Maryland; Surgeon in Charge of the Baltimore Eye and Ear Institute, etc. etc.

TWELVE months since I published my experiences with the hypodermic use of strychnia in retinal troubles. Since that period I have used it daily in nervous affections of the eye, with very varied results, at times very striking, again quite negative. In no case has the use of the remedy been followed by any injurious effects, although a few cases were quite susceptible to its toxic influences. I have been surprised to find that in increasing daily the quantity injected under the skin, a much larger amount than that mentioned by the books may be safely administered, with good results. In my early experiences I always commenced with the $\frac{1}{60}$ of a grain, and slowly increased until $\frac{1}{30}$ of a grain was used, which latter amount I was afraid to exceed. Now I usually commence with the $\frac{1}{40}$ of a grain.

The strength of the solution which I use is sulph. strychniæ grs. iv., aquæ dest. ℥j, each minim containing the $\frac{1}{120}$ of a grain of the alkaloid. The sulphate of strychnia is quite soluble in pure water, at least to this ex-